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PROGRESS REPORT

PROJECT CRITIQUES

JANUARY, 1973

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

WATER RESOURCES
DIVISION
GRANT W BUSWELL
ADMINISTRATOR

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January 19, 1973

MEMORANDUM

TO: Grant Buswell, Administrator, Water Resources Division

FROM: Orrin Ferris, Chief, Engineering Bureau

SUBJECT: Progress Report - Project Critiques, January, 1973

Attached hereto is the progress report on project critiques that you requested. The Engineering Bureau has prepared this report in compliance with directives to the Montana Department of Natural Resources and Conservation.

These directives have come from reports prepared by the Office of the Legislative Auditor and the Montana Legislative Council. Both of these reports require that project critiques be formulated for all projects in which title to land is vested in the Water Resources Division.

This report describes the progress that has been made to date on project critique work in general. Project summaries have been prepared (current to January, 1973) which describe the recent history of thirty-five state-owned projects. This information is available in the report entitled "Progress Report, Project Critiques, Supplement A," which provides data supplementary to the material herein. Supplement A gives information on individual projects concerning the current status of water purchase contracts, principal, operation and maintenance charges, most recent inspection findings, the status of water measurement, recent project repairs, the status of water rights, and, in some cases, material concerning the economic analysis of the project. Engineering and right-of-ways data and a general project map are also provided.

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PROGRESS REPORT

PROJECT CRITIQUES

January, 1973

By:

Orrin Ferris, Chief

Richard L. Bondy, Project Engineer

Eric Hansen, Assist. Project Engineer

Engineering Bureau
Water Resources Division
Department of Natural Resources & Conservation

Sam W. Mitchell Building
Helena, Montana 59601

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Introduction

The Montana Department of Natural Resources and Conservation through its Water Resources Division has been given the task of writing project critiques for all water development projects owned by the State of Montana. This direction has come from two sources, the Office of the Legislative Auditor and the Montana Legislative Council.

In 1971 the Office of the Legislative Auditor completed an audit of the former Water Resources Board for the fiscal year ending June 30, 1970. A major portion of this report dealt with the administration of state owned water resource projects and the following recommendations were included. "We recommend that the board:

" 1. Formulate a critique of each project under its jurisdiction.

" 2. Resolve the status of each project as dictated by each critique by either abandoning or repairing the various projects.

" 3. Establish operation and maintenance charges which are sufficient to:

a. Reimburse the state for past recoverable expenditures.

b. Finance future operation and maintenance.

c. Accumulate a reserve for contingencies."

According to the report the critique should include:

" 1. A factual determination of the past, present, and future direct and indirect benefits from each project.

" 2. A determination and evaluation of the reasons why revenue from operation and maintenance charges has been insufficient to support the full extent of operation, maintenance, and repair expenses.

" 3. An accounting of state expenditures on the project for operation, maintenance and repair, and the status of those expenditures insofar as repayment is concerned.

" 4. A determination of what additional maintenance and repair work is warranted for each project in terms of potential direct and indirect benefits to the water users and the state.

" 5. A determination of the various alternatives available to the board in recovering, writing off, or otherwise disposing of past state expenditures for operation and maintenance.

" 6. A determination of the most appropriate manner of accomplishing and financing operation, maintenance, and repair in the future for each project."

In 1972 the Water Resources Subcommittee of the Montana Legislative Council prepared and issued Report No. 53 entitled "Water Resources," to the 43rd Legislative Assembly.

With regard to the project critiques, the Montana Legislative Council recommended that a critique be formulated for each active project and also for those inactive projects in which title to land is vested in the Water Resources Division. Such critiques should include:

> "(a) Total state investment in the original construction of the project.
>
> "(b) Total state investment recovered to date through sale of water and value of unsold water reserves.
>
> "(c) Historical listing of state expenditures for project operation and maintenance and related repayment to date.
>
> "(d) Description of state-owned real or personal property attached to the project, including water rights, if any.
>
> "(e) A multi-use economic analysis to determine the viability of the state's interest in each project."

Organization Considerations for Completion of Project Critiques

An advisory committee consisting of Water Resources Division personnel has been established to oversee the development of each project critique. Expertise in engineering, planning, economics, hydrology, and soils is available to the committee, which will assist the Engineering Bureau in writing and reviewing project critique reports.

A generalized "work task schedule" has been developed for the purpose of organizing the work to be done on each individual project. This schedule is divided into six phases, most of which include several sub-tasks. In addition, the advisory committee will meet at least three times to guide the effort. First, an inventory of existing information will be made and a "work plan" finalized. Secondly, engineering, water resource, and land resource data will be gathered in the field, after which an assessment of the potential for management and development will be made. Finally, a detailed study of the alternatives, rehabilitation plan, and economic investigations will be made and the final report prepared. The work task schedule is outlined in Appendix A.

The project critique report will generally be structured as outlined in Appendix B. The major chapters will include resource inventory, potential for management and development and engineering, economic, and environmental investigations. A more detailed outline of investigation plans has been prepared for use by the committee.

The critiques will be accomplished by preparation of different types of reports. The most extensive reports, termed "Pre-feasibility Reports," will include those for larger projects needing the most in-depth analysis. The status of nine of the projects will be outlined in "Review Reports" where in-depth investigations are not warranted. "Terminal Reports" will be prepared to describe the status of approximately fifty projects. On many of the smaller projects the state simply owns right-of-way easements. Previous "Water Conservation Board" reports have included recommendations that these projects be abandoned.

Appendix C lists the various projects for which reports will be written, according to their priority. In certain instances, two projects are grouped for study because of their physical relationship, even through the projects are controlled by separate water users associations. Several items were considered in establishing priorities. The physical condition of the water control structures was considered in many cases. The financial status of the project, particularly in those cases where large amounts of debts to the state will not be recovered under current contracts, was a key factor. In a few instances local interest in rehabilitation of the project gave the project a higher priority than it otherwise would merit. The size of the project was also considered, and in general the larger projects will be studied first.

Progress Reports

Project summaries have been prepared (current to January, 1973) which describe the recent history of thirty-five state owned projects. This information is available in a report entitled "Progress Report, Project Critiques, Supplement A," which provides data supplementary to the material herein. Supplement A gives information on each individual project concerning the current status of water purchase contracts, principal, operation and maintenance charges, most recent inspection findings, the status of water measurement, recent project repairs, the status of water rights, and in some cases, material concerning the economic analysis of the project. A chart showing pertinent engineering and right-of-way data and a general project map of the area are also included. A graph and table showing the relationship between storage in acre feet and elevation of water surface in reservoirs are provided when available. Supplement A to this report is available on request from the Water Resources Division, Department of Natural Resources and Conservation, Mitchell Building, Helena, Montana 59601.

The status of project critique work on seven of the thirty-five projects described in Supplement A is briefly discussed below to demonstrate the progress to date. Field and office work has been virtually completed for the writing of project critiques on the Daly Ditches and Broadwater-Missouri Projects. The Delphia-Melstone and Nilan-Florence Projects have the next highest priorities, and field work will begin on these as soon as personnel is available. The last three projects discussed herein are the Sidney, Little Dry and Columbus Projects, on which construction work has been completed with federal cost sharing during the past two years.

Considerable work has already been accomplished which will be applicable to writing project critiques for the three last mentioned.

Less recent historical information is available on most projects. R. J. Kelly, Administrative Officer, completed a report in 1961 entitled "Summary of Activities from Inception, January 22, 1934 to June 30, 1960 of the State Water Conservation Board," which provides an excellent history of construction, formation of water users associations, status of water contracts, and financial status through 1960. The financial portion of this report was updated in 1965 by the State Water Conservation Board, and this data is also available upon request.

Daly Ditches Project, Ravalli County

Design work is now being accomplished for replacement of structures under a ten year rehabilitation program, which was initiated three years ago utilizing funds from the Bitterroot Resources Conservation and Development program. At that time the Montana Water Resources Board and the Soil Conservation Service prepared a "Project Measure" report which demonstrated the feasibility of the work scheduled in the ten-year program. It was agreed at that time that a more comprehensive evaluation of the project would be completed as soon as possible.

A new "Project Measure" is currently being formulated by the Soil Conservation Service based on extensive field work done by the Department of Natural Resources and Conservation and the U. S. Bureau of Reclamation. Work not previously included in the "Project Measure" will include construction of two large diversions in the Bitterroot River. The existing diversions are old, and the operation and maintenance (O & M) costs have increased rapidly in recent years. They were severely damaged during the record flood peak in the spring of 1972. Plans are being prepared to include the two diversions and other needed work in a two to three year rehabilitation program. Funding arrangements and the approval of the Ravalli Water Users' Association have not yet been finalized.

Broadwater-Missouri, Toston

Most of the field work necessary for completion of a project critique has been accomplished. Preliminary engineering investigations have been completed on all problem areas, most of which are recorded in a report prepared by a student intern, G.V.V. Rao, working under the Resources Development Internship program sponsored by the Western Interstate Commission for Higher Education (WICHE). The report, entitled "Critique of the Broadwater-Missouri Irrigation Project," lists five locations requiring rehabilitation work. The most significant problem on the project not covered in the Rao Report is seepage from the main canal immediately below the diversion. A concrete canal lining project to correct this situation was prepared by the Soil Conservation Service with surveys by the Department and was advertised for bids. The estimated cost was $352,000, 70% of which

was to be paid by a grant from the Rural Environmental Assistance Program (REAP). The low bid of $383,000 by Watters Construction Company was not accepted by the water users. Therefore, less permanent solutions to the seepage problem will now have to be investigated.

Delphia-Melstone Project, Musselshell River

A high priority has been placed on the completion of the project critique of this project for the Lower Musselshell Water Users' Association. Although the project is currently meeting the necessary O & M expenses, the State will not be able to recover its original investment under the present contracts. The primary reason for this is that the total number of acres used in the project design was never developed, and, hence, water has been contracted for only a small percentage of the acres. Large blocks of land could potentially be added to the project in the future.

An additional problem is that the project relies in part on Deadman's Basin for its water supply. Deadman's Basin is an offstream storage facility over 100 river miles above the project. Since the Musselshell River is not adjudicated, the water is not being delivered by a water commissioner. The canals experience considerable difficulty in receiving, at their diversion,the stored water released from Deadman's Basin. Many other users of Musselshell River water are not, of course, able (or willing) to determine whether the flow at a given time is stored water or the natural flow of the Musselshell.

Nilan-Florence, Augusta

A considerable amount of water is available for sale under this project. The design and the allocation of costs were based on full development of this facility. Since this did not occur, the State under current contracts will not recover its investment. There is, however, potential for further expansion and such planning is currently being considered by local individuals and groups. The Department has established a high priority for the completion of a project critique so that current activities will be included in an orderly expansion of the project.

Sidney Project

The Sidney Water Users' Association has just completed the expansion and rehabilitation of this project for approximately 1.2 million dollars. Fifty percent (50%) of the cost was funded with a grant authorized under PL 566 as administered by the Soil Conservation Service. Several drains are now being constructed and only minor additional work is needed on the project. The development of new water purchase contracts with the water users is currently underway.

Little Dry Project (Wasson Flats), Jordan

Complete rehabilitation of this project was accomplished during the fall of 1972. Work included reconstructing the diversion from Little Dry Creek, rebuilding the canal system, and adding to and rebuilding turnouts and siphons. $52,000 of this $144,000 project was provided by a grant under the REAP Program of the Agricultural Stabilization and Conservation Service.

Columbus Project

In the fall of 1971 two major siphons were constructed on the Columbus Canal at an approximate cost of $140,000. Fifty percent (50%) cost sharing was available to this project through the Beartooth Resource Conservation and Development Program administered by the Soil Conservation Service. Except for routine operation and maintenance, no further work will be necessary in the near future on this project. New contracts with the individual water users are currently being prepared.

Financial Condition of Projects

The 1971 Legislative Audit outlined the overall financial condition of the projects based on original state indebtedness. This report separated seventeen projects which were built with federal grants and money received from bonds sold to the federal government. The bonds were repurchased by the State at a reduced rate in 1951. Principal payments on these projects are returned to the State "General Fund." The audit also listed the financial condition of the "other active projects." Principal payments for water from these projects are deposited in an "Earmarked Revenue Fund."

Appendix D of this report shows the financial condition of the projects as related to the current book charges against those specific projects. Although the financial history of the projects has not been investigated, the book charges apparently alter the original construction cost by adding operation and maintenance money spent since the completion of construction, by subtracting any income credited to the project, and by subtracting the amount allowed to be "written off" by the Water Conservation Board. The table in Appendix D also shows the amount of expected revenue based on current contracts and the balance of repayment contracts which were secured for money advanced for operation, maintenance and replacement work. The last two columns show, respectively, the expected over-recovery and the amount not presently secured by water purchase contracts.

It should be noted that Appendix D does not reflect the reallocations of federal bonds as proposed by the Legislative Audit. The Department of Natural Resources and Conservation has agreed to make these adjustments and will do so as a part of the project critique investigations.

It was pointed out in the aforementioned Audit and Subcommittee Reports that the Department should be certain that sufficient O & M assessments are made to cover the current operation and maintenance of the projects,

so that additional State funds will not be needed for that purpose. O & M rates have been increased during the past two years to satisfy this directive. Appendix E summarizes the water charge history of the projects for the past five years, showing the original principal charge plus the O & M assessments and special assessments that have been levied. In a large percentage of the projects, the various associations either have collected or are collecting money to be saved in reserve accounts for contingencies.

Water Rights and Measurements

Water rights (date and amount of appropriation and type of right) are summarized in Appendix F. Appendix G enumerates the kinds and numbers of water measurement devices used on the individual projects.

Project Inspections

The Department of Natural Resources and Conservation through the Engineering Bureau has initiated a regular inspection program of state owned structures. The primary emphasis has been on dam safety, and one engineer recently hired has been designated a "Dam Safety Engineer." The Department has actively improved the quality of dam safety inspection, personnel and facilities. Recently over $3,000 was spent on equipment for dam inspections relating to improved safety conditions for the inspector. Over twenty dams owned by the State will be inspected at least annually, and some of these will be inspected biannually. The inspections of all other project features will be completed as time permits. A survey of structure conditions will be included in each project critique report.

APPENDIX A

PROJECT CRITIQUE - WORK TASK SCHEDULE

PHASE I: Information Inventory

Tasks
1. Review past operation, maintenance and repair accomplishments
2. Review inspection reports
3. Perform initial investigation of problems identified

FIRST CHECK: Finalize Study Plan, prepare file report

PHASE II: Project Inventory (Mapping and Field Investigations)

Tasks
1. Map and analyze distribution system
2. Rate life and capacity of existing structures
3. Identify needs (structural and physical system)
4. Identify other potential uses of project land and water

PHASE III: Land Use Inventory

Tasks
1. Map soils
2. Map irrigated and irrigable acres
3. Determine crop water requirements

SECOND CHECK: Assess the potential for management and development of project area.

PHASE IV: Detailed Study of Alternative Rehabilitation Plans

Tasks
1. Consider alternative system components
2. Estimate preliminary costs

PHASE V: Economic Investigations

THIRD CHECK: Formulate project

PHASE VI: Critique Report

APPENDIX B

PROJECT CRITIQUE - INVESTIGATION PLAN

I. Resource Inventory
   - A. Water Supply
   - B. Soil Resources
   - C. Environmental Resources
   - D. Human Resources
   - E. Present Land Use
   - F. Local Economy

II. Potentials for Management and Development
   - A. Irrigation
   - B. Flood Control
   - C. Recreation
   - D. Municipal and Industrial
   - E. Environmental

III. Engineering Investigations
   - A. Existing System
     - 1. Description
     - 2. Problems
   - B. Development of Alternative Plans
   - C. Design Work for Alternatives
   - D. Cost Estimates for Various Alternatives

IV. Economic Investigations
   - A. Benefit/Cost Analysis
   - B. Cost Sharing and Cost Allocation
   - C. Potential Financing
   - D. Financial History

V. Environmental Investigations
   With/Without Analysis for Each Alternative

APPENDIX C

PROJECT CRITIQUE PRIORITIES

PRE-FEASIBILITY REPORTS

Priority I

Broadwater-Missouri
Daly Ditches
Deadman's Basin, Delphia-Melstone
Flint Creek
Nilan, Florence
Petrolia
Rock Creek (Cooney)
Tongue River
Warhorse (Winnett)

Priority II

Hysham
Livingston
Nevada Creek, North Side Canal
Ruby, West Bench, Vigilante

Priority III

Ackley
Cataract
Columbus
Cottonwood
Fred Burr
Frenchman
Green Mountain
Little Dry (Wasson Flats)
Middle Creek (Hyalite)
Painted Rocks (West Fork Bitterroot)
Paradise
Park Branch
Sidney
Smith River, South Side Canal
Upper Musselshell
Willow Creek
Yellowater

REVIEW REPORTS

Bainville
Big Dry
Charlo Water Supply
Hotchkiss
Lewistown Ditch
Lisk Creek
North Winifred
Theboe Lake
Valentine

TERMINAL REPORTS

Alexander
Big Horn Tullock
Bishoff
Blyton
Brady Water Supply
Buckley
Burgess
Burnside
Bushell
Camp Creek
Community Gravity W. S.
Daniels
Davis
Deer Creek
Fadness
Fatzinger
Findlater
Fletcher
Francis
Hall
Hawkinson
Highwood
Jones
Kennedy
Love
Neiser
Nickwall
Noble
Outlook
Pardis
Pierce
Red Butte Cr.
Reder
Red Horse
Richardson
Riley
Ruffato
Ryegate
Sehm
Sinclair
Shipley
Steffon
Straub
Sweetzer
Switzer
Vincelette
Voss
West Fork of Poplar
Williams
Wold

APPENDIX D

RECOVERY OF STATE INVESTMENT

Project Name	Book Charges June 30, 1972 *1	Receivables, June 30, 1972			State Investment	
		Water Purchase Contracts *2	Repayment Contracts *3	Total	Over Recovered	Not Secured by Current Contracts
Ackley Lake *4	$ 46,391.39	$ 6,858.40	$ 7,079.58	$ 13,937.98	$	$ 32,453.41
Broadwater-Missouri *4	100,884.52	132,590.93		132,590.93	31,706.41	
Cataract	246,965.61					246,965.61
Charlo Water Supply	2,332.83	2,332.83		2,332.83		
Columbus *4	25,749.88	3,609.84		3,609.84		22,140.04
Cottonwood	49,857.55	51,149.69		51,149.69	1,292.14	
Daly Ditches	296,438.02	296,438.02		296,438.02		
Deadman's Basin *4	220,295.48	213,659.00	2,630.53	216,289.53		4,005.95
Flint Creek *4	133,534.83	95,186.00	1,155.00	96,341.00		37,193.83
Florence Canal	176,260.13	19,110.30	12,965.00	32,075.30		144,184.83
Fred Burr	39,662.26	37,337.50		37,337.50		2,324.76
Frenchman	140,324.70	123,788.75		123,788.75		16,535.95
Hysham Pumping	431,241.80	306,226.12	31,381.28	337,607.40		93,634.40
Livingston Ditches *4	4,280.09	2,463.00		2,463.00		1,817.09
Lower Musselshell (Delphia-Melstone)	1,127,813.61	178,085.25	3,500.00	181,585.25		946,228.36
Middle Creek *4	151,699.58	152,461.05		152,461.05	761.47	
Nevada Creek *4	61,680.79	65,126.25		65,126.25	3,445.46	
Nilan	346,798.32	122,945.00		122,945.00		223,853.32
North Fork of Smith River *4	(983.25)	7,124.50		7,124.50	8,107.75	
North Side Canal	131,806.31	4,400.00		4,400.00		127,406.31
Paradise Valley	278,112.77	238,285.00		238,285.00		39,827.77
Park Branch *4	47,941.73	47,715.00	(1.19)	47,713.81		227.92
Petrolia	472,046.79	208,812.00	49,951.41	258,763.41		213,283.38
Red Butte	4,803.85	4,800.00		4,800.00		3.85
Rock Creek *4	47,203.35	266,095.00	10,942.50	277,037.50	229,834.15	
Ruby River *4	57,210.72	66,194.80		66,194.80	8,984.08	
Sidney Pumping *4	99,307.74	31,025.30	10,650.00	41,675.30		57,632.44
South Side Canal	31,757.02	21,705.00	213.65	21,918.65		9,838.37
Tongue River *4	103,423.57	916,284.03 *5		916,284.03 *5	812,860.46	
Upper Musselshell *4	114,665.13	123,145.00		123,145.00	8,479.87	
Vigilante	266,862.27	131,328.00		131,328.00		135,534.27

APPENDIX D (continued)

RECOVERY OF STATE INVESTMENT

Project Name	Book Charges June 30, 1972*1	Receivables, June 30, 1972			State Investment	
		Water Purchase Contracts *2	Repayment Contracts *3	Total	Over Recovered	Not Secured by Current Contracts
West Bench	$ 53,568.27	$ 44,442.00		$ 44,442.00		$ 9,126.27
West Fork of Bitterroot *4	(3,410.22)		$ 5,000.00	5,000.00	$ 8,410.22	
Willow Creek *4	(881.72)	21,903.75		21,903.75	22,785.47	
Winnett	2,603.06					2,603.06
Yellowater	6,170.67	18,200.00	3,474.43	21,674.43	15,503.76	
TOTAL	$ 5,314,419.45	$ 3,960,827.31	$ 138,942.19	$ 4,099,769.50	$ 1,152,171.24	$ 2,366,821.19

*1. Net value of expenditures less credits given to various projects from July 1, 1965 to June 30, 1972 was added to Book Balance as of June 30, 1965, prepared by Robert Kelly in his Summary of Activities from Inception January 22, 1934 to June 30, 1965. Exhibit "F" "Operation of State Water Conservation Board Funds from January, 1934 to June, 1965."

*2. Source: Water Purchase Contract Ledger

*3. Source: Repayment Contract Ledger

*4. Bonded Projects: Book charges have not yet been adjusted to reflect reallocation of the 1951 Bond Purchase from the federal government.

*5. This projected income does not include 4,175 acre feet optioned by the Montana Power Company. The option rate of $2.25 per acre foot provides an annual income of $9,393.75. This option must be excercised by the tenth aniversary of the contract (1982). If the total amount of water is used, annual income will be 4175 acre feet X $25.00 = $104,375.00. Term of contract is 40 years.

APPENDIX E

WATER CHARGES

PROJECTS CHARGED BY THE ACRE FOOT

PROJECT	CHARGES PER ACRE FOOT BY YEAR					COMMENTS
	1969	1970	1971	1972	1973	
Ackley Lake						
Principal	0.80	0.80	0.80	0.80	0.80	Raised 1973 O & M to start reserve fund.
O & M	1.00	1.00	1.00	1.00	1.20	
Total Charge	1.80	1.80	1.80	1.80	2.00	
Broadwater-Missouri						
Principal	0.91	0.91	0.91	0.91	0.91	Has small reserve fund Users are opposed to a large reserve fund. Expenses will be lower this year. Repayment contract has been paid, so special assessment ended this year.
O & M	0.76	0.76	0.76	0.91	0.86	
Special Assessment	0.22	0.22	0.22	0.22	0	
Total Charge	1.89	1.89	1.89	2.04	1.77	
Deadman's Basin						
Principal	0.75	0.75	0.75	0.75	0.75	A reserve fund has been started.
O & M	0.50	0.50	0.50	0.60	0.60	
Total Charge	1.25	1.25	1.25	1.35	1.35	
Flint Creek						
Principal	1.00	1.00	1.00	1.00	1.00	A reserve fund is being re-built.
O & M	1.00	1.00	1.00	1.25	1.25	
Total Charge	2.00	2.00	2.00	2.25	2.25	
Florence Canal						
Principal	0.75	0.75	0.75	0.75	0.75	O & M was raised to start reserve fund. They also pay Nilan Project Principal and O & M charges.
O & M	0.50	0.50	0.75	0.90	0.90	
Total Charge	1.25	1.25	1.50	1.65	1.65	
Fred Burr						
Principal	2.50	2.50	2.50	2.50	2.50	Users are assessed by Association when expenses are incurred.
O & M	0	0	0	0	0	
Total Charge	2.50	2.50	2.50	2.50	2.50	

APPENDIX E (cont'd)

WATER CHARGES

PROJECT CHARGED BY THE ACRE FOOT

PROJECT	CHARGES PER ACRE FOOT BY YEAR					COMMENTS
	1969	1970	1971	1972	1973	
Frenchman						
Principal	0.75	0.75	0.75	0.75	0.75	Has adequate reserve fund.
O & M	0.25	0.25	0.25	0.25	0.25	
Total Charge	1.00	1.00	1.00	1.00	1.00	
Middle Creek						
Principal	1.96	1.96	1.96	1.96	1.96	Has adequate reserve fund.
O & M	0.47	0.47	0.47	0.47	0.47	
Total Charge	2.43	2.43	2.43	2.43	2.43	
Nevada Creek						
Principal	1.05	1.05	1.05	1.05	1.05	Has adequate reserve fund.
O & M	0.95	0.95	0.95	0.95	0.95	
Total Charge	2.00	2.00	2.00	2.00	2.00	
Nilan Storage						
Principal	1.00	1.00	1.00	1.00	1.00	O & M was raised to start reserve fund.
O & M	0.75	0.75	0.75	0.90	0.90	
Total Charge	1.75	1.75	1.75	1.90	1.90	
Painted Rocks						
Principal	1.30	1.30	1.30	1.30	1.30	O & M for dam only . Daly Tiches and Fish & Game Dept. are only users.
O & M	0.10	0.10	0.10	0.10	0.10	
Total Charge	1.40	1.40	1.40	1.40	1.40	
Petrolia						
Principal	2.00	2.00	2.00	2.00	2.00	Has no reserve fund. One repayment cont. has been paid, so special assessment was reduced.
O & M	1.00	1.00	1.00	1.00	1.38	
Special Assessment	1.38	1.38	1.38	1.38	1.00	
Total Charge	4.38	4.38	4.38	4.38	4.38	

WATER CHARGES

PROJECTS CHARGED BY THE ACRE FOOT

PROJECT	CHARGES PER ACRE FOOT BY YEAR					COMMENTS
	1969	1970	1971	1972	1973	
Rock Creek						O & M on dam only. Canals not State owned. Has adequate reserve fund; however, substantial repairs are being planned. Special Assessment is to purchase some land below Cooney Dam.
Principal	1.00	1.00	1.00	1.00	1.00	
O & M	0.15	0.15	0.15	0.15	0.15	
Special Assessment	0	0.10	0.10	0.10	0.10	
Total Charge	1.15	1.25	1.25	1.25	1.25	
Ruby River						
Principal	0.56	0.56	0.56	0.56	0.56	Has adequate reserve fund. O & M for dam only.
O & M	0.24	0.24	0.24	0.24	0.24	
Total Charge	0.80	0.80	0.80	0.80	0.80	
Sidney						
Principal	0.45	0.45	0.45	0.45	1.93	Project has been rebuilt. Users have agreed to start a reserve fund.
O & M	2.00	2.10	2.10	2.10	2.10	
Total Charge	2.45	2.55	2.55	2.55	4.03	
Smith River						
Principal	0.90	0.90	0.90	0.90	0.90	O & M was raised to meet rising costs and start a reserve fund.
O & M	0.10	0.10	0.10	0.10	0.25	
Total Charge	1.00	1.00	1.00	1.00	1.15	
South Side Canal						
Principal	0.20	0.20	0.20	0.20	0.20	The Association also has an assessment from time to time for repairs. The $.30 does not cover all the expenses. The users also pay Smith River Project Principal and O & M charges.
O & M	0.30	0.30	0.30	0.30	0.30	
Total Charge	0.50	0.50	0.50	0.50	0.50	

APPENDIX E (cont'd)

WATER CHARGES

PROJECTS CHARGED BY THE ACRE FOOT

PROJECT	CHARGES PER ACRE FOOT BY YEAR					COMMENTS
	1969	1970	1971	1972	1973	
Tongue River						
Principal	1.30	1.30	1.30	1.30	1.30	Has adequate reserve fund. Decrease was possible because of large number of new contracts.
O & M	0.37	0.32	0.32	0.32	0.28	
Total Charge	1.67	1.62	1.62	1.62	1.58	
Upper Musselshell						
Principal	1.10	1.10	1.10	1.10	1.10	Has a small reserve fund.
O & M	0.90	0.90	0.90	0.90	0.90	
Total Charge	2.00	2.00	2.00	2.00	2.00	
Vigilante Canal						
Principal	0.50	0.50	0.50	0.50	0.50	Has no reserve fund. They also pay Ruby River project Principal and O & M charges.
O & M	0.50	0.50	0.70	0.70	0.70	
Total Charge	1.00	1.00	1.20	1.20	1.20	
West Bench Canal						O & M raised to meet rising costs. Has no reserve fund. The users also pay Ruby River Project Principal and O & M charges.
Principal	0.30	0.30	0.30	0.30	0.30	
O & M	0.45	0.55	0.55	0.60	0.70	
Total Charge	0.75	0.85	0.85	0.90	1.00	
Willow Creek						
Principal	0.75	0.75	0.75	0.75	0.75	O & M will be raised next year to meet increased costs and begin reserve fund.
O & M	0.20	0.20	0.20	0.20	0.20	
Total Charge	0.95	0.95	0.95	0.95	0.95	
Yellowater						
Principal	1.00	1.00	1.00	1.00	1.00	Users are assessed by association when expenses are incurred.
O & M	0	0	0	0	0	
Total Charge	1.00	1.00	1.00	1.00	1.00	

APPENDIX E (cont'd)

WATER CHARGES

PROJECTS CHARGED BY THE MINERS' INCHES

PROJECT	CHARGES PER MINERS INCH BY YEAR					COMMENTS
	1969	1970	1971	1972	1973	
Columbus						O & M expenses should be reduced as a result of new construction. O & M charge to remain the same to start a reserve fund.
Principal	1.56	1.56	1.56	1.56	1.56	
O & M	2.05	2.05	2.05	2.05	2.05	
Total Charge	3.61	3.61	3.61	3.61	3.61	
Livingston Ditch						The Association has a small reserve fund. A repayment contract has been paid so they are now able to begin a major improvement program. First priority is measuring devices.
Principal	1.00	1.00	1.00	1.00	1.00	
O & M	3.45	3.45	3.45	3.45	3.45	
Special Assessment	0.25	0.25				
Total Charge	4.70	4.70	4.45	4.45	4.45	
Paradise						O & M was raised to meet rising costs. The Assn. has no reserve fund.
Principal	2.00	2.00	2.00	2.00	2.00	
O & M	1.00	1.25	1.25	1.25	1.50	
Total Charge	3.00	3.25	3.25	3.25	3.50	
Park Branch						No reserve fund, but the association has a good improvement program which has been continued for a number of years
Principal	1.00	1.00	1.00	1.00	1.00	
O & M	0.80	0.80	0.80	0.80	0.80	
Total Charge	1.80	1.80	1.80	1.80	1.80	

APPENDIX E (cont'd)

WATER CHARGES

PROJECTS CHARGED BY THE ACRE

PROJECT	CHARGES PER ACRE BY YEAR 1969	 1970	 1971	 1972	 1973	COMMENTS
Delphia-Melstone						The Association has begun a maintenance program, but has no reserve fund. Special Assessment is for some canal cleaning.
Principal	2.00	2.00	2.00	2.00	2.00	
O & M	2.25	2.50	2.50	3.00	3.00	
Special Assessment	0.25	0.25	0.25	0.25	0.25	
Total Charge	4.50	4.75	4.75	5.25	5.25	
Hysham Pumping						The Association has no reserve fund. A moratorium was allowed on principal for 3 years to allow the Assn. to regain financial stability by using all money collected for O & M. The S.A. is for some canal cleaning.
Principal	1.75	0	0	0	1.75	
O & M	4.00	6.65	6.65	6.65	6.65	
Special Assessment	1.35	0.85	0.85	0.85	0.85	
Total Charge	7.10	7.50	7.50	7.50	9.25	

DALY DITCHES PROJECT

		CHARGES BY YEAR				COMMENTS
PER ACRE		1970	1971	1972	1973	
Standard Charge	3.00	3.00	3.00	3.00	5.26	O & M has been raised to meet rising costs. One charge includes repaying the state's investment, amortized new const., and O & M costs. There are also special agreements and special rates for small users.
Special Assessment	0.50	0.50	1.00	1.00	0	
Total Charge	3.50	3.50	4.00	4.00	5.26	
PER MINERS INCH						
Total Charge	2.60	2.60	2.60	2.60	2.60	

APPENDIX F
WATER RIGHTS SUMMARY

WATER RIGHTS SUMMARY

PROJECT	COUNTY	STREAM	DATE OF APPROPRIATION	AMOUNT	COMMENTS
ACKLEY LAKE	Judith Basin	Judith River	8-20-1935	4,000 MI	Filed-
BROADWATER-MISSOURI	Broadwater	Missouri River	6-28-1938	16,000 MI	Filed-
CHARLO	Lake	Well	1-01-1948	93 GPM	Filed-
COLUMBUS	Stillwater	Yellowstone River and Tributaries	9-01-1937	All Unappropriated Waters	Filed-
COTTONWOOD	Park	Cottonwood Creek and Tributaries	6-23-1953	All Unappropriated Waters	Filed-
DALY DITCHES	Ravalli	Bitterroot River	6-01-1885	6,000 MI	Decreed-
		"	4-15-1898	5,600 MI	Decreed-
	TOTAL	Bitterroot River		11,600 MI	or 290 Cubic Ft. Per Sec.
		Skalkaho Creek	6-15-1865	110 MI	Deeded Decree-
		"	5-01-1867	160 MI	Deeded Decree-
		"	5-01-1868	80 MI	Deeded Decree-
		"	6-01-1868	320 MI	Deeded Decree-
		"	5-01-1869	160 MI	Deeded Decree-
		"	5-01-1870	300 MI	Deeded Decree-
		"	5-01-1870	160 MI	Deeded Decree-
		"	6-01-1870	40 MI	Deeded Decree-
		"	5-01-1872	100 MI	Deeded Decree-
		"	5-01-1872	160 MI	Deeded Decree-

WATER RIGHTS SUMMARY

PROJECT	COUNTY	STREAM	DATE OF APPROPRIATION	AMOUNT	COMMENTS
DALY DITCHES (Continued)	Ravalli	Skalkaho Creek	5-01-1875	40 MI	Deeded Decree-
		"	6-01-1875	40 MI	Deeded Decree-
		"	5-01-1880	190 MI	Deeded Decree-
		"	6-01-1884	110 MI	Deeded Decree-
		"	5-01-1882	145 MI	Deeded Decree-
		"	5-01-1883	320 MI	Deeded Decree-
		"	5-01-1883	1,600 MI	Deeded Decree-
		"	5-01-1883	200 MI	Deeded Decree-
		"	9-30-1883	640 MI	Deeded Decree-
		"	10-16-1885	160 MI	Deeded Decree-
		"	4-28-1885	266 MI	Deeded Decree-
		"	6-26-1888	1,360 MI	Deeded Decree-
		"	5-01-1891	1,680 MI	Deeded Decree-
		"	5-01-1889	1,200 MI	Deeded Decree-
	TOTAL	Skalkaho Creek		9,541 MI	or 238.5 cfs.
					(Some water users also have exchange rights from Skalkaho Creek for 3,161 Miners Inches. Daly Ditches exchanges this for Bitter-root water.)
		Gird Creek	6-09-1869	600 MI	Filed-

WATER RIGHTS SUMMARY

PROJECT	COUNTY	STREAM	DATE OF APPROPRIATION	AMOUNT	COMMENTS
DALY DITCHES (Continued)	Ravalli	Gird Creek	6-26-1894	150 MI	Filed-
		" "	6-20-1882	50 MI	Filed-
		" "	5-01-1872	100 MI	Filed-
		" "	5-01-1870	600 MI	Filed-
		" "	1868	200 MI	Filed-
	TOTAL	Gird Creek		1,700 MI	or 42.5 cfs
		S. Fk. Skalkaho Cr. (Reservoir #1)	1912	All Waters	Water Rights based upon use and U.S. Forest Service Permit.
		S. Fk. Skalkaho Cr. (Reservoir #2)	1912	All Waters	Water Rights based upon use and U.S. Forest Service Permit.
		N. Fk. Skalkaho Cr. (Reservoir #3)	1912	All Waters	Water Rights based upon use and U.S. Forest Service Permit.

Exchange water rights from the Skalkaho Creek that are used by the Department of Natural Resources and Conservation on this project are too numerous to mention here, but are on file in the Department's office. However, these exchange water rights total 3,160.986 miners inches and are used on higher lands, mainly through the Ward, Skalkaho, and Hi-Line Ditches. The owners of these exchange rights have land which is located below the Republican and Hedge Ditches and is supplied with equivalent water from these ditches.

APPENDIX F
WATER RIGHTS SUMMARY

WATER RIGHTS SUMMARY

PROJECT	COUNTY	STREAM	DATE OF APPROPRIATION	AMOUNT	COMMENTS
DEADMAN'S BASIN	Wheatland Golden Valley & Musselshell	Musselshell River	5-10-1934	All Unappropriated Waters	Filed-
FLINT CREEK	Granite	Cow Creek	3-18-1936	All Unappropriated and Surplus Water	Filed- for the Morman Canal
		Cow Creek	3-18-1936	"	Filed- for the Marshall Creek Canal
		Flint Cr. & Tribs.	3-18-1936	"	Filed- for the Morman Canal, surface waters above from Flint Creek Canal, for the Fred Burr Creek Canal.
		Fred Burr Creek	3-18-1936	"	Filed- two appropriations for the Fred Burr Creek Canal.
		Haystack Gulch and Tributaries	3-18-1936	"	Filed- for the Marshall Canal, surface water above the Morman Canal, surface water above the Marshall Creek Canal.
		Trout Creek and Tributaries	3-18-1936	"	Filed- two appropriations for Marshall Creek Canal and Flint Creek Canal.
		E. Fk. Trout Creek and Tributaries	3-18-1936	"	Filed- for the Flint Creek Canal.
		Middle Fork of Willow Creek	3-18-1936	"	Filed- for the Morman Canal

WATER RIGHTS SUMMARY

PROJECT	COUNTY	STREAM	DATE OF APPROPRIATION	AMOUNT	COMMENTS
FLINT CREEK (Continued)	Granite	North Fork of Willow Creek	3-18-1936	All Unappropriated and Surplus Water	Filed- for the Morman Canal.
		South Fork of Willow Creek	3-18-1936	"	Filed- for the Morman Canal.
		Unnamed Canal	3-18-1936	"	Filed- for the Main Supply Canal.
		Unnamed Coulees	3-18-1936	"	Filed- six appropriations for the Marshall Creek Canals.
		Unnamed Coulees	3-18-1936	"	Filed- three appropriations for the Morman Canal.
		Unnamed Coulee	3-18-1936	"	Filed- for the Fred Burr Creek Canal.
		Unnamed Creek	10-22-1935	"	Filed-
		Douglas Creek	6-12-1944	300 MI	Filed-
		Flint Creek	6-12-1944	600 MI	Filed-
		East Fork of Rock Creek	10-22-1935	All Unappropriated and Surplus Water	Decreed-
FRED BURR	Ravalli	Fred Burr Creek	6-01-1870	60 MI	Deeded Decree-
		Fred Burr Creek	5-25-1946	All Unappropriated Waters	Filed-
FRENCHMAN	Phillips	Frenchman Creek	7-25-1950	"	Filed-
GLEN MOUNTAIN	Sanders	Swamp Creek	5-18-1939	"	Filed-

APPENDIX F
WATER RIGHTS SUMMARY

WATER RIGHTS SUMMARY

PROJECT	COUNTY	STREAM	DATE OF APPROPRIATION	AMOUNT	COMMENTS
HYSHAM PUMPING	Treasure	Yellowstone River and Tributaries	9-19-1945	200 cfs	Filed-
LEWISTOWN	Fergus	Big Springs Creek	6-08-1891	3,000 MI	Filed-
		"	12-18-1911	2,000 MI	Filed-
		"	9-23-1936	5,000 MI	Filed-
LITTLE DRY	Garfield	Little Dry Creek	8-29-1936	2,000 MI	Filed-
LIVINGSTON DITCH	Park	Yellowstone River	8-08-1890	6,000 MI	Filed-
		"	12-14-1900	500 cfs	Filed-
		"	5-19-1903	60,000 MI	Filed-
		"	5-01-1936	77 cfs	Filed-
LOWER MUSSELSHELL (DELPHIA-MELSTONE)	Musselshell	Musselshell River	4-02-1949	10,000 MI	Filed-
MIDDLE CREEK STORAGE	Gallatin	Middle Creek (Hylite Creek)	7-12-1938	All Unappropriated Waters	Filed-
NEVADA CREEK	Powell	Nevada Creek	9-01-1937	All Unappropriated Waters	Filed-
NILAN	Lewis & Clark	Ford Creek and Tributaries	8-22-1950	All Unappropriated Waters	Filed-
		Smith Creek and Tributaries	8-22-1950	All Unappropriated Waters	Filed-
NORTH FORK SMITH RIVER STORAGE	Meagher	North Fork of the Smith River	8-20-1935	All Unappropriated Waters	Filed-

APPENDIX F
WATER RIGHTS SUMMARY

WATER RIGHTS SUMMARY

PROJECT	COUNTY	STREAM	DATE OF APPROPRIATION	AMOUNT	COMMENTS
WEST FORK BITTERROOT STORAGE (PAINTED ROCKS RESERVOIR)	Ravalli	West Fork of the Bitterroot River	none	none	-
PARADISE	Park	Yellowstone River	10-23-1935	250 cfs	Filed-
PARK BRANCH	Park	Yellowstone River	10-23-1935	250 cfs	Filed- In addition the Department aquired all of the Park Branch Co.'s rights through a deed dated May 5, 1936.
PETROLIA	Petroleum	Elk Creek-Flat Willow Creek and Tributaries	3-31-1950	All Unappropriated Waters	Filed-
		Johnson Coulee and Tributaries	7-19-1947	"	Filed-
		Flat Willow Creek	3-31-1950	"	Filed-
RED LODGE-ROCK CREEK	Carbon	Willow Creek	5-01-1896	150 MI	Deeded Decree-
		Willow Creek	5-01-1896	100 MI	Deeded Decree-
		Rock Creek (Glacier Lake Res.)	5-10-1934	All Unappropriated Waters	Filed-
		Red Lodge Creek (Cooney Res.)	5-10-1934	All Unappropriated Waters	Filed-
RUBY RIVER	Madison	Garden Creek	5-15-1880	All Waters	Decreed-
		Certain Spring and Lake	4-26-1892	100 MI	Decreed-
		West Fork of the Ruby River	9-03-1928	200 MI	Decreed-

WATER RIGHTS SUMMARY

PROJECT	COUNTY	STREAM	DATE OF APPROPRIATION	AMOUNT	COMMENTS
RUBY RIVER (Continued)	Madison	Ruby River and Tributaries	4-08-1938	All Unappropriated Waters	Filed-
SIDNEY	Richland	Yellowstone River and Tributaries	9-01-1937	All Unappropriated Waters	Filed-
		"	12-15-1938	All Unappropriated Waters	Filed- as an "amendatory declaration".
THEBOE LAKE	Teton	South Fork of Willow Creek	12-02-1936	All Unappropriated Waters	Filed-
TONGUE RIVER	Big Horn, Rosebud and Custer	Tongue River	4-19-1937	All Unappropriated Waters	Filed- in Rosebud County
		"	1-31-1938	All Unappropriated Waters	Filed- in Big Horn County
UPPER MUSSELSHELL	Meagher and Wheatland	North Fork of the Musselshell River (Martinsdale Res.)	4-22-1938	All Unappropriated Waters	Filed-
		South Fork of the Musselshell River (Martinsdale Res.)	4-22-1938	All Unappropriated Waters	Filed-
		North Fork of the Musselshell River (Durand Res. now called Bair Res.)	4-22-1938	All Unappropriated Waters	Filed-
VALENTINE	Fergus	Blood Creek and Tributaries	11-30-1935	Flood Waters	Filed-
WAR HORSE (WINNETT IRR. COMPANY)	Petroleum	Duck Creek	11-16-1909	200 MI	Filed-
		Ford Creek	8-08-1911	20,000 MI	Filed- Aquired from the Winnett Irrigation Co. 12-20 1934

WATER RIGHTS SUMMARY

PROJECT	COUNTY	STREAM	DATE OF APPROPRIATION	AMOUNT	COMMENTS
WAR HORSE (WINNETT IRR. COMPANY) Continued	Petroleum	Ford Creek	8-18-1911	10,000 MI	Filed- Aquired from the Winnett Irrigation Co. 12-20-1934
		Buffalo Creek	8-09-1914	20,000 MI	Filed- Aquired from the Winnett Irrigation Co. 12-20-1934
		Certain Dry Coulee	12-30-1911	2,500 MI	Filed- Aquired from the Winnett Irrigation Co. 12-20-1934
		Ford Creek and Tributaries	8-20-1935	All Unappropriated Waters	Filed-
WILLOW CREEK	Gallatin	Willow Creek	8-20-1935	All Unappropriated Waters	Filed-
YELLOWATER	Petroleum	Yellowater Creek and Tributaries	11-27-1935	All Unappropriated Waters	Filed-

APPENDIX G

WATER MEASUREMENT SUMMARY

Ackley Lake:

No measuring devices. Turnouts are mostly concrete headwalls with wooden stop planks. Three turnouts have screw slide gates.

Broadwater-Missouri:

Propeller meter measurement system.
Three or four Parshall flumes.

Cataract:

Water commissioner.

Columbus:

No measuring devices.
Approximately thirty turnouts up to 42" in size. Concrete headwalls with slide gates.

Deadman's Basin:

Seventeen turnouts in canals plus private diversions in river.
Two meter gates.

Delphia-Melstone:

No measuring devices.
Turnouts are concrete headwalls and metal screw slide gates.

Flint Creek: (Upper Valley)

Thirty-seven turnouts, twenty-two meter gates, thirteen Parshall flumes.
Two weirs, one pump with meter.

(Lower Valley)

Approximately thirty turnouts, each with a meter gate, Parshall flume or submerged orifice.

Frenchman:

No measuring devices.
Private diversions out of river, mostly metal pipes and headgates.

Hysham Pumping:

All water is measured through Penvane box, seventy-nine turnouts, fifteen without concrete headwall, ninety-one measuring boxes.

WATER MEASUREMENT SUMMARY

Livingston Ditch:

Forty-two turnouts, mostly concrete headwalls with metal slide gates.
No measuring devices.

Nevada Creek:

Twenty-eight turnouts, about five wooden turnouts. The rest are concrete headwalls with metal slide gates.
Twenty-eight measuring devices, fourteen meter gates and fourteen Penvane boxes.

Nilan:

Twenty turnouts, mostly concrete headwalls and screw slide gates, one meter gate measuring device.

Paradise Canal:

Twenty-eight turnouts with concrete headwall.
Twenty-eight measuring devices, including twenty-two orifice gates, four meter gates, and two weir spillways.

Park Branch:

Thirty turnouts with concrete headwalls and metal screw gates.
Twenty Parshall flumes.

Red Lodge Rock Creek:

Water commissioner.
Uses Parshall flumes.

Ruby River:

All private diversions from river.
No measuring devices.

Smith River:

Water commissioner.

South Side Canal:

Six turnouts in use with weirs used for measuring.

Tongue River:

Private diversions from river.

WATER MEASUREMENT SUMMARY

Upper Musselshell:

Thirty-eight turnouts in canals plus private diversions from river.
Twenty-four meter gates.

Vigilante Canal:

Eighty turnouts with concrete headwalls and screw gates.
Seventy-seven meter gates.

West Bench Canal:

Thirty-six turnouts with concrete headwalls and screw gates.
Thirty-six meter gates.

Willow Creek:

Fifteen turnouts, two Parshall flumes.
All private diversions.